

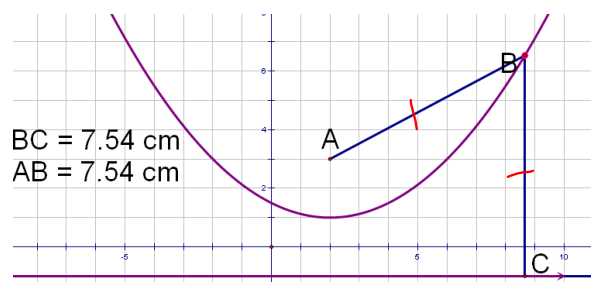
8-2 Parabolas

Conic Sections--figure that can be obtained by slicing a double cone

p419



Parabola--set of all points in a plane that are the same distance from a given point (focus) and a given line (directrix)



gsp

Equation of a Parabola

$$y = a(x - h)^2 + k$$

$V(h, k)$

+a opens up

-a opens down

axis $x = h$

Distance between vertex and focus
Distance between vertex and directrix

$$\left| \frac{1}{4a} \right|$$

Latus rectum--The segment that goes through the focus and is perpendicular to the axis of symmetry

$$\text{Length} = \left| \frac{1}{a} \right|$$

$$\text{Distance between endpoints and the focus} = \left| \frac{1}{2a} \right|$$

Example 1:

$$y = \frac{1}{16}(x-2)^2 + 3$$

$$V(2, 3)$$

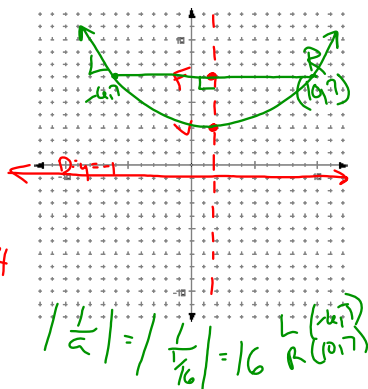
$$\text{a.o.s } x = 2$$

$$a = \frac{1}{16}$$

$$\left| \frac{1}{4a} \right| = \left| \frac{1}{4 \cdot \frac{1}{16}} \right| = 4$$

$$F(2, 7)$$

$$D: y = -1$$



Example 2:

$$4(y+9) = (x+6)^2$$

$$y+9 = \frac{1}{4}(x+6)^2$$

$$y = \frac{1}{4}(x+6)^2 - 9$$

$$V(-6, -9)$$

$$\text{a.o.s } x = -6$$

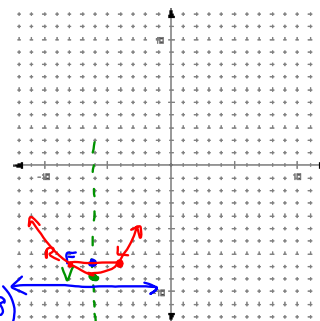
$$\left| \frac{1}{4} \right| = 1$$

$$L.R. \left| \frac{1}{4} \right| = 4$$

$$F(-6, -8)$$

$$D: y = -10$$

$$L(-4, -8) \quad R(-8, -8)$$



Equation of a Parabola

$$x = a(y-k)^2 + h$$

$$V(h, k)$$

+a opens right

-a opens left

$$\text{a.o.s } y = k$$

Distance between vertex and focus

Distance between vertex and directrix

$$\left| \frac{1}{4a} \right|$$

Latus rectum--The segment that goes through the focus and is perpendicular to the axis of symmetry

$$\text{Length} = \left| \frac{1}{a} \right|$$

$$\text{Distance between endpoints and the focus} = \left| \frac{1}{2a} \right|$$

Example 2:

$$x = -\frac{1}{12}(y-5)^2 - 2$$

$$V(-2, 5)$$

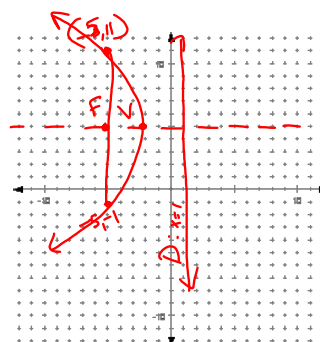
$$\text{a.o.s } y = 5$$

$$\left| \frac{1}{4(-\frac{1}{12})} \right| = 3$$

$$F(-3, 5)$$

$$D: x = -1$$

$$L.R. = 12$$



HW
p423-424
5, 18, 23

Attachments

parabola_sketch.gsp